Amendments to the Claims

1. (Currently Amended) Method of transmitting data on multiple carriers from a transmitter to a receiver, the said method consisting, on the transmitter side, of binary to signal coding of the data to be transmitted so as to form modulation signals, of modulating a plurality of sub-carriers with the said modulation signals so as to form signals, referred to as OFDM symbols, and then of transmitting, over ~~the said~~ a channel between the said transmitter and the said receiver, the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, and, on the receiver side, of determining, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples, and of estimating the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, ~~characterised in that the~~ wherein said estimation step ~~is designed to correct~~ comprising correcting the changes in the position of the analysis window with respect to the said transmitted signal without changing said receiver sampling frequency.

2. (Currently Amended) Data transmission method according to

Claim 1, ~~characterized in that the~~ wherein said estimation step ~~consists of~~ comprising demodulating the said sub-carriers for the said block of samples under consideration and then correcting the effects of the transmission channel between the transmitter and the receiver, the said step of correcting the changes in the position of the analysis window consisting of estimating the phase difference between two consecutive symbols and using this phase difference during the said correction of the effects of the transmission channel between the transmitter and the receiver.

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3. (Currently Amended) ~~Data transmission method according to Claim 2, characterized in that,~~ Method of transmitting data on multiple carriers from a transmitter to a receiver, the said method consisting, on the transmitter side, of binary to signal coding of the data to be transmitted so as to form modulation signals, of modulating a plurality of sub-carriers with the said modulation signals so as to form signals, referred to as OFDM symbols, and then of transmitting, over a channel between the said transmitter and the said receiver, the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, and, on the receiver side, of determining, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block

of samples, and of estimating the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said estimation step comprising correcting the changes in the position of the analysis window with respect to the said transmitted signal;

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wherein said estimation step comprising demodulating the said sub-carriers for the said block of samples under consideration and then correcting the effects of the transmission channel between the transmitter and the receiver, the said step of correcting the changes in the position of the analysis window consisting of estimating the phase difference between two consecutive symbols and using this phase difference during the said correction of the effects of the transmission channel between the transmitter and the receiver;

wherein for estimating the phase difference between two consecutive symbols~~, it consists of~~ said method comprising estimating the degree of shift of the sampling frequency of the receiver with respect to that of the transmitter,

$$\delta = \delta f_e / f_e^E = (f_e^R - f_e^E) / f_e^E$$

the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\Pi k \delta T_s / T_u$$

where T_s is the total length of the symbol under

consideration, T_u its useful part, *k* being the index of the carrier under consideration and n being the index of the OFDM symbol under consideration.

4. (Currently Amended) ~~Data transmission method according to Claim 2, characterized in that, for~~ Method of transmitting data on multiple carriers from a transmitter to a receiver, the said method consisting, on the transmitter side, of binary to signal coding of the data to be transmitted so as to form modulation signals, of modulating a plurality of sub-carriers with the said modulation signals so as to form signals, referred to as OFDM symbols, and then of transmitting, over a channel between the said transmitter and the said receiver, the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, and, on the receiver side, of determining, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples, and of estimating the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said estimation step comprising correcting the changes in the position of the analysis window with respect to the said transmitted signal;

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wherein said estimation step ~~consists of~~ comprising

demodulating the said sub-carriers for the said block of samples under consideration and then correcting the effects of the transmission channel between the transmitter and the receiver, the said step of correcting the changes in the position of the analysis window consisting of estimating the phase difference between two consecutive symbols and using this phase difference during the said correction of the effects of the transmission channel between the transmitter and the receiver;

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wherein estimating the phase difference between two consecutive symbols~~, it consists of~~ includes taking into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\Pi k \alpha T / T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

5. (Currently Amended) ~~Data transmission method according to Claim 3, characterized in that,~~ Method of transmitting data on multiple carriers from a transmitter to a receiver, the said method consisting, on the transmitter side, of binary to signal coding of the data to be transmitted so as to form modulation signals, of modulating a plurality of sub-carriers with the said modulation signals so as to form signals, referred to as OFDM symbols, and

then of transmitting, over a channel between the said transmitter and the said receiver, the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, and, on the receiver side, of determining, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples, and of estimating the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said estimation step comprising correcting the changes in the position of the analysis window with respect to the said transmitted signal;

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wherein said estimation step comprising demodulating the said sub-carriers for the said block of samples under consideration and then correcting the effects of the transmission channel between the transmitter and the receiver, the said step of correcting the changes in the position of the analysis window consisting of estimating the phase difference between two consecutive symbols and using this phase difference during the said correction of the effects of the transmission channel between the transmitter and the receiver;

wherein for estimating the phase difference between two consecutive symbols said method comprising estimating the degree of shift of the sampling frequency of the receiver with respect to

that of the transmitter,

$$\delta = \delta f_e / f_e^E = (f_e^R - f_e^E)/f_e^E$$

the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\Pi k \delta T_s / T_u$$

where T_s is the total length of the symbol under consideration, T_u its useful part, *k* being the index of the carrier under consideration and n being the index of the OFDM symbol under consideration;

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wherein for estimating the phase difference between two consecutive symbols~~, it consists of~~ said method comprising taking into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\Pi k(\delta T_s + \alpha T)/T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

6. (Currently Amended) ~~Data transmission method according to claim 1, characterized in that it consists of~~ Method of transmitting data on multiple carriers from a transmitter to a receiver, the said method consisting, on the transmitter side, of

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binary to signal coding of the data to be transmitted so as to form modulation signals, of modulating a plurality of sub-carriers with the said modulation signals so as to form signals, referred to as OFDM symbols, and then of transmitting, over a channel between the said transmitter and the said receiver, the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, and, on the receiver side, of determining, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples, and of estimating the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said estimation step comprising correcting the changes in the position of the analysis window with respect to the said transmitted signal;

estimating the response of the channel for one or more reference symbols transmitted at the same time as the said transmitted symbols and of applying the said phase difference between consecutive symbols to the said transmission channel estimation by means of the following recursive equation:

$$\tilde{H}_{k,n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$$

where $\tilde{H}_{k,n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$ represents the estimation of the

channel response for the carrier of index k and for the OFDM symbol of index n, $\beta'_{k,n}$ being the estimation of the phase difference between the consecutive OFDM symbols of respective indices $n - 1$ and n for the carrier of index k.

7. (Currently Amended) Data transmission method according to claim ~~1~~2, ~~characterized in that it consists of~~ further comprising estimating the response of the transmission channel for one or more distributed pilots transmitted at the same time as the said transmitted symbols, of interpolating, time-wise and frequency-wise, the frequency response of the channel at all frequencies and for all symbols and of applying the said phase difference between consecutive symbols to the said transmission channel estimation.

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8. (Currently Amended) Data transmission method according to claim ~~1~~3, according to which the binary to signal coding is of the differential type, ~~characterized in that it consists of~~ further comprising shifting the phase, by the said phase difference between consecutive OFDM symbols, of the result of ~~the~~ differential demodulation for the carrier of index k of the nth OFDM symbol.

9. (Currently Amended) Receiver in a system for transmitting data on multiple carriers, of the type designed to receive signals transmitted by a transmitter, the said transmitter being designed

for binary to signal coding of the data to be transmitted so as to form modulation signals, for modulating a plurality of sub-carriers with the said modulation signals so as to form symbols, referred to as OFDM symbols, and then for transmitting the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, the said receiver being designed to determine, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples and to estimate the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, ~~characterised in that the~~ wherein said receiver ~~is designed~~ comprising components to correct the changes in the position of the analysis window with respect to the said transmitted signal without changing said receiver sampling frequency.

10. (Currently Amended) Receiver according to Claim 9, ~~characterized in that,~~ wherein for estimating the said transmitted modulation signals, ~~it has means for~~ said receiver comprising means for demodulating the said sub-carriers for the said block of samples under consideration and means for correcting the effects of the transmission channel between the transmitter and the receiver, and in that, for correcting the changes in the position of the

analysis window, it has means for estimating the phase difference between two consecutive symbols, the said phase difference then being used by the means for correcting the effects of the transmission channel between the transmitter and the receiver.

11. (Currently Amended) ~~Receiver according to Claim 10, characterized in that,~~ Receiver in a system for transmitting data on multiple carriers, of the type designed to receive signals transmitted by a transmitter, the said transmitter being designed for binary to signal coding of the data to be transmitted so as to form modulation signals, for modulating a plurality of sub-carriers with the said modulation signals so as to form symbols, referred to as OFDM symbols, and then for transmitting the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, the said receiver being designed to determine, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples and to estimate the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said receiver comprising components to correct the changes in the position of the analysis window with respect to the said transmitted signal;

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wherein for estimating the said transmitted modulation

signals, said receiver comprising means for demodulating the said sub-carriers for the said block of samples under consideration and means for correcting the effects of the transmission channel between the transmitter and the receiver, and in that, for correcting the changes in the position of the analysis window, it has means for estimating the phase difference between two consecutive symbols, the said phase difference then being used by the means for correcting the effects of the transmission channel between the transmitter and the receiver;

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wherein for estimating the phase difference between two consecutive symbols, ~~the~~ said receiver ~~is designed~~ comprising components to estimate the degree of shift of the sampling frequency of the receiver with respect to that of the transmitter,

$$\delta = \delta f_e / f_e^E = (f_e^R - f_e^E) / f_e^E$$

the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\Pi k \delta T_s / T_u$$

where T_s is the total length of the symbol under consideration, T_u its useful part, k being the index of the carrier under consideration and n being the index of the OFDM symbol under consideration.

12. (Currently Amended) ~~Receiver according to Claim 10,~~

~~characterized in that,~~ Receiver in a system for transmitting data on multiple carriers, of the type designed to receive signals transmitted by a transmitter, the said transmitter being designed for binary to signal coding of the data to be transmitted so as to form modulation signals, for modulating a plurality of sub-carriers with the said modulation signals so as to form symbols, referred to as OFDM symbols, and then for transmitting the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, the said receiver being designed to

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determine, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples and to estimate the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said receiver comprising components to correct the changes in the position of the analysis window with respect to the said transmitted signal;

wherein for estimating the said transmitted modulation signals, said receiver comprising means for demodulating the said sub-carriers for the said block of samples under consideration and means for correcting the effects of the transmission channel between the transmitter and the receiver, and in that, for correcting the changes in the position of the analysis window, it has means for estimating the phase difference between two

consecutive symbols, the said phase difference then being used by the means for correcting the effects of the transmission channel between the transmitter and the receiver;

wherein for estimating the phase difference between two consecutive symbols, ~~it is designed~~ said receiver comprising components to take into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\Pi k(\alpha T)/T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

13. (Currently Amended) ~~Receiver according to Claim 11, characterized in that,~~ Receiver in a system for transmitting data on multiple carriers, of the type designed to receive signals transmitted by a transmitter, the said transmitter being designed for binary to signal coding of the data to be transmitted so as to form modulation signals, for modulating a plurality of sub-carriers with the said modulation signals so as to form symbols, referred to as OFDM symbols, and then for transmitting the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, the said receiver being designed to determine, from a clock signal at a frequency related to a sampling

frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples and to estimate the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said receiver comprising components to correct the changes in the position of the analysis window with respect to the said transmitted signal;

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wherein for estimating the said transmitted modulation signals, said receiver comprising means for demodulating the said sub-carriers for the said block of samples under consideration and means for correcting the effects of the transmission channel between the transmitter and the receiver, and in that, for correcting the changes in the position of the analysis window, it has means for estimating the phase difference between two consecutive symbols, the said phase difference then being used by the means for correcting the effects of the transmission channel between the transmitter and the receiver;

wherein for estimating the phase difference between two consecutive symbols, said receiver comprising components to estimate the degree of shift of the sampling frequency of the receiver with respect to that of the transmitter,

$\delta = \delta f_e / f_e^E = (f_e^R - f_e^E) / f_e^E$

the said phase difference between two consecutive symbols then being equal to:

$\beta_{k,n} = 2\Pi k \delta T_s / T_u$

where T_s is the total length of the symbol under consideration, T_u its useful part, k being the index of the carrier under consideration and n being the index of the OFDM symbol under consideration;

wherein for estimating the phase difference between two consecutive symbols, ~~it is designed~~ said receiver comprising components to take into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

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$\beta_{k,n} = 2\Pi k(\delta T_s + \alpha T)/T_u$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

14. (Currently Amended) ~~Receiver according to claim 9, characterized in that it is designed~~ Receiver in a system for transmitting data on multiple carriers, of the type designed to receive signals transmitted by a transmitter, the said transmitter being designed for binary to signal coding of the data to be transmitted so as to form modulation signals, for modulating a plurality of sub-carriers with the said modulation signals so as to form symbols, referred to as OFDM symbols, and then for

transmitting the said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency, the said receiver being designed to determine, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an analysis window for the signal received from the transmitter so as to form a block of samples and to estimate the said transmitted modulation signals by demodulating the said sub-carriers for the said block of samples under consideration, wherein said receiver comprising components to correct the changes in the position of the analysis window with respect to the said transmitted signal;

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wherein said receiver comprising components to estimate the response of the channel for one or more reference symbols transmitted, by said transmitter, at the same time as the said transmitted symbols and to apply the said phase difference between consecutive symbols to the said transmission channel estimation by means of the following recursive equation:

$$\tilde{H}_{k,n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$$

where $\tilde{H}_{k,n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$ represents the estimation of the channel response for the carrier of index k and for the OFDM symbol of index n, $\beta'_{k,n}$ being the estimation of the phase difference between the consecutive OFDM symbols of respective indices $n - 1$ and n for the carrier of index k.

15. (Currently Amended) Receiver according to claim ~~9~~10, ~~characterized in that it is designed~~ said receiver comprising components to estimate the response of the transmission channel for one or more distributed pilots transmitted at the same time as the said transmitted symbols, to interpolate, time-wise and frequency-wise, the frequency response of the channel at all frequencies and for all symbols and to apply the said phase difference between consecutive symbols to the said transmission channel estimation.

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16. (Currently Amended) Receiver according to claim 9, the said binary to signal coding performed by the said transmitter being of the differential type, ~~characterised in that it is designed~~ said receiver comprising components to shift the phase, by the said phase difference between consecutive OFDM symbols, of the result of the differential demodulation for the carrier of index *k* of the *n*th OFDM symbol.

17. (New) A method of receiving data transmitted on multiple carriers, comprising:

receiving a signal transmitted over a channel, said signal including a plurality of carriers and a plurality of symbols modulated on to the carriers at a transmitter sampling frequency;

converting said received signal into a digital signal to output said symbols at a receiver sampling frequency;

determining a time window for said symbol output to form a group of samples to demodulate;

demodulating said group of samples using an estimation of deviation between said transmitter and receiving sampling frequency, the deviation estimation based on predetermined variation of time window position, to recover at least a portion of the transmitted symbols without changing the receiver sampling frequency.

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18. (New) The method of Claim 17, wherein said demodulating includes determining the deviation estimation from determining phase shift between two symbols of the transmitted signal.

19. (New) The method of claim 17, wherein said demodulating includes varying the time window position in relation to said deviation estimation to recover said at least a portion of the transmitted symbols.

20. (New) A receiving system for receiving data transmitted on multiple carriers, comprising:

a receiver for receiving a signal transmitted over a channel, said signal including a plurality of carriers and a plurality of symbols modulated on to the carriers at a transmitter sampling frequency;

a converter for converting said received signal into a digital signal to output said symbols at a receiver sampling frequency;

a controller for determining a time window for said symbol output to form a group of samples to demodulate;

at least one demodulator for demodulating said group of samples using an estimation of deviation between said transmitter and receiving sampling frequency, the deviation estimation based on predetermined variation of time window position, to recover at least a portion of the transmitted symbols without changing the receiver sampling frequency.

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21. (New) The system of Claim 20, wherein said at least one demodulator to determine the deviation estimation from determining phase shift between two symbols of the transmitted signal.

22. (New) The system of claim 20, wherein said at least one demodulator to recover said at least a portion of the transmitted symbols from varying the time window position in relation to said deviation estimation.